Electric Machine, in Particular a Three-Phase Generator

Background of the Invention

The invention relates to an electric machine, in particular a three-phase generator[, with the characterizing features mentioned in the preamble to claim 1.

Prior Art]

Electric machines that are embodied as three-phase generators are known. These are used, for example, for supplying power to the electrical system in motor vehicles. In this connection, an excitation winding disposed on a rotor is excited with a direct current. This produces a magnetic field, which is conducted to alternatingly disposed claw poles of a claw-pole rotor. Through the alternating disposition of the claw poles, the north and south poles of the magnetic field alternate with one another. The claw-pole rotor is encompassed by a stator which has a winding packet. In a three-phase generator, this winding packet is comprised of windings that are connected together in three-phase fashion, which are penetrated by the magnetic field in accordance with the rotation of the claw-pole rotor. This induces a voltage in the winding packet, which is tapped as the generator voltage in the windings that are respectively connected together into one phase. A three-phase generator that is constructed in this manner is described, for example, in DE 34 08 394 A1.

German Patent 2 4 680 has disclosed forming the windings of a winding packet from winding wires that are connected to one another in parallel.

[Advantages] Summary of the Invention

In keeping with these objects, one feature of present invention resides, briefly stated, in an electrically machine in which out of at least three parallel wound winding wires of a phase, at least two are connected to separate phase terminals at each of which a partial generator voltage can be tapped.

The electric machine according to the invention[, with the features mentioned in claim 1,] offers the advantage that depending on the wiring of the winding packet, different levels of generator voltage can be tapped. By virtue of the fact that at least two of the at least three parallel wound winding wires of a phase are respectively connected to separate phase terminals, at each of which a respective partial generator voltage can be tapped, a partial generator voltage can be supplied as needed at the phase terminals associated with each phase. In a preferable embodiment of the invention, the provision is made that in order to tap a total generator voltage that is made up of the partial generator voltages, the phase terminals of a phase can be connected in series. By means of this, it is easily possible for the parallel wound windings to be connected in series by way of a switching means in order to thus produce a higher generator voltage when needed.

By and large, it is possible through simple means, which can be realized without intervention into the structural embodiment of the electric machine, to use an electric machine to supply different levels of generator voltage.

[Other advantageous embodiments of the invention ensue from the remaining features that are mentioned in the dependent claims.]

Brief Description of the Drawings

The invention will be explained in detail below in exemplary embodiments in conjunction with the accompanying drawings.

Fig. 1 is a schematic, partial view of a three-phase generator;

Fig. 3 is an enlarged detail from the partial view, and

Figs. 2, and 4 to 6 show wiring variations of the three-phase generator.

Description of the [Exemplary] Preferred Embodiments

Fig. 1 shows a schematic detail of a section through a three-phase generator 10. The three-phase generator 10 has claw-pole rotor 14 disposed on a drive shaft 12 so that it is fixed against relative rotation. The claw-pole rotor 14 has claw poles 20 and 22 that alternatingly extend from pole disks 16 and 18 coaxial to the drive shaft 12. By means of an excitation winding - not shown in Fig. 1 - disposed on the drive shaft 12, which winding is powered with direct current, the claw poles are magnetized so that magnetic north poles N and magnetic south poles S are disposed alternatingly over the circumference of the claw-pole rotor 12.

The claw-pole rotor 14 is encompassed by a stator 24, which supports a winding packet 26. The winding packet 26 is composed of a number of windings 28 which are disposed in grooves 30 of a stator lamination bundle 32.

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